



September 14, 2012

MEMORANDUM

Subject: Review of Available Science for Dissolved Oxygen Impacts in Hood Canal

From: Thomas Eaton, Director
Washington Operations Office
EPA Region 10

Sally Toteff, Director
Southwest Regional Office
Washington Department of Ecology

Ben Cope, Environmental Engineer
Office of Environmental Assessment
EPA Region 10

Mindy Roberts, Environmental Engineer
Environmental Assessment Program
Washington Department of Ecology

To: All Interested Parties

Over the last several years, a number of studies have been conducted to better understand the factors affecting low dissolved oxygen levels and associated fish kills in Hood Canal. While extensive monitoring and analysis has been conducted, discussions among researchers in 2010 indicated that there were different estimates of the impact of human activity in the watershed on oxygen levels in Hood Canal. In March 2011, the Hood Canal Coordinating Council (HCCC) requested that EPA and Ecology “produce a brief summary on the current available scientific knowledge about human impacts on low dissolved oxygen” to support the development of an Aquatic Rehabilitation Action Plan for Hood Canal. In response to this request, we have drafted a comprehensive review and synthesis of available information on this topic. We are working with HCCC to organize meetings to present information and solicit comments on this draft report from HCCC organizations and the general public.

The draft report summarizes monitoring and analysis conducted by several departments at the University of Washington, U.S. Geological Survey, Pacific Northwest National Laboratory, Kitsap County, and Mason County. In the process of developing the draft report, we have engaged researchers in multiple rounds of review. Recognizing the importance, complexity, and interdisciplinary aspects of the scientific questions under review, we requested that the Puget Sound Institute conduct an additional round of review from an independent panel of experts in early 2012. The panel review was guided by specific charge questions that focused

on differences in methodology and interpretation in the research summarized by EPA and Ecology. The panel identified a number of important issues in the analyses to date, and we revised our report to highlight these issues. The panel's July 2012 review and our responses to the panel's comments are included along with this transmittal of the stakeholder draft report. We emphasize that peer review generally leads to better scientific products, but it does not always lead to consensus. Some of the findings in the draft report are subjects of ongoing discussion among the researchers.

In the draft report, we summarize findings from a 2008 peer-reviewed study of sediment cores from Hood Canal. This study found that dissolved oxygen conditions in Hood Canal were better in the 20th century than in the 19th century despite the increase in human activity over that period. The sediment cores also indicated that oxygen conditions have varied in a long-term pattern similar to decadal climate oscillations. In addition, we report that human releases of nitrogen are not significantly contributing to the low dissolved oxygen levels in the main arm Hood Canal, where the influx of oceanic nitrogen greatly exceeds the nitrogen inputs from surrounding watersheds. The report summarizes a compelling finding by the Hood Canal Dissolved Oxygen Program (HCDOP) that periodic fish kills are caused by a cascade of natural processes that include the influx of nitrogen-rich ocean water, low river flows in late summer, and strong southwesterly winds.

A consistent finding in the available information is that the greatest human impacts to dissolved oxygen likely occur at the landward terminus of Hood Canal (Lynch Cove). We find that the current impact from human-caused nitrogen releases may be cause for concern, but the available information in this area is uncertain. We hope that by pulling the available information together and identifying the uncertainties, this report helps inform the planning of future studies.

In addition to a report on the science, HCCC requested a review of the regulatory framework and requirements that will support pollution-control activities in Hood Canal. EPA and Ecology provided information on applicable regulations to the HCCC on August 15, 2012. This document, alongside the draft science report, will provide HCCC with a framework to discuss implementation options for prevention and/or reduction of nitrogen releases into Hood Canal.

It is important to recognize that the information requested from EPA and Ecology is focused solely on dissolved oxygen. While dissolved oxygen is a major concern in Hood Canal, bacterial contamination of shellfish beds is an equally significant concern, and ongoing governmental activities in the basin are focused primarily on preventing shellfish contamination. These activities include Pollution Identification and Correction (PIC) programs and construction of centralized wastewater treatment plants in higher population zones such as Belfair. In reducing the discharge of wastewater to the groundwater along Hood Canal, these activities serve the dual purpose of reducing risks from both pathogens and nutrients. The monitoring data collected along the shoreline by the PIC programs provide clear evidence that the management of wastewater systems should remain a top priority in this sensitive environment.

The findings of the draft report do not support the development of a state water quality improvement plan (Total Maximum Daily Load or TMDL) at this time. This leaves open the

opportunity for local, state and federal agencies to use “Direct Implementation Program” approaches which employ proven actions to prevent or reduce pollution. PIC programs are examples of this type of approach. Another possible tool is to designate Hood Canal as an “Outstanding Resource Water,” which would provide additional protections against water quality degradation. Additional details about these and other tools are described in the August 15, 2012 information sent to HCCC.

While the draft report concludes that although human-caused pollution does not cause or contribute to the fish kills near Hoodsport, our agencies strongly support additional protections to ensure that nitrogen and bacteria loadings from human development are minimized. Water quality concerns extend beyond low dissolved oxygen and include bacteria and other pathogens that limit shellfish health. Overall, human impacts to Hood Canal water quality vary from place to place and at different times of year. Hood Canal is a very sensitive waterbody and people living in the watershed should continue their efforts to minimize human sources of pollution.

In the coming months, we will work with HCCC to share and discuss the draft report with tribal governments, local leaders and residents, state and local resource agencies, non-governmental organizations, and other interested individuals. EPA and Ecology will respond to comments on the scientific aspects of the report. In parallel, we will assist HCCC as it considers public comments on the policy and planning implications of the draft report.